

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): An apparatus for detecting a transmission mode in a digital audio receiver, comprising:

a null symbol length calculation unit for calculating ~~the~~ a null symbol length of each ~~sample frame~~ by detecting the starting and end points of the null symbol of each ~~sample frame~~ by obtaining ratios of sums of squared symbol values; and

a mode determination unit for determining a transmission mode by comparing the null symbol length calculated by the null symbol length calculation unit with a predetermined range of the null symbol length for each mode.

2. (canceled).

3. (currently amended): The apparatus of claim ~~[[2]]~~ 1, wherein the null symbol length calculation unit comprises:

a window buffer portion for storing the square values of the samples received for first or second search period in two window buffers having the same size;

a ~~mean-square~~ sum of squares ratio calculator for calculating ~~the mean-square of the samples-ratios of sums of first square values~~ stored in a first of the two window buffers to respective sums of second square values stored in a second of the two window buffers;

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a null symbol location detector for determining the starting point of a null symbol by detecting a minimum ~~mean-square ratio~~ value output from the ~~mean-square~~ sum of squares ratio calculator for the first search period, outputting a search period control signal for changing the first search period to the second search period, and determining the end point of the null symbol by detecting a maximum ~~mean-square ratio~~ value from the ~~mean-square~~ sum of squares ratio calculator for the second search period; and

a step controller for changing the search periods for the window buffer portion and the ~~mean-square~~ sum of squares ratio calculator from the first search period to the second search period, in response to the search period control signal output from the null symbol location detector.

4. (currently amended): The apparatus of claim 3, wherein the size of each window buffer is equal to the data symbol length for MODE 3 of the digital audio broadcasting scheme as defined in the present specification.

5. (currently amended): The apparatus of claim 3, wherein the first search period is equal to the frame length for MODE 1 of the digital audio broadcasting scheme as defined in the present specification.

6. (currently amended): The apparatus of claim 3, wherein the second search period is longer than the null symbol length for MODE 1 of the digital audio broadcasting scheme as defined in the present specification.

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7. (currently amended): A method for detecting a transmission mode in a digital audio receiver, comprising the steps of:

(a) calculating ~~the~~ a null symbol length of each ~~sample~~ frame by detecting the starting and end points of the null symbol of each ~~sample~~ frame by obtaining ratios of sums of squared symbol values; and

(b) determining a transmission mode by comparing the null symbol length calculated in step (a) with a predetermined range of the null symbol length for each mode.

8. (canceled).

9. (currently amended): The method of claim ~~[[8]]~~ 7, wherein step (a) comprises the sub-steps of:

(a1) calculating first ratios of ~~the mean~~ square values for a first search period by dividing ~~the sum~~ sums of the first square values of each sample stored in a first window buffer by ~~the sum~~ respective sums of the square of each sample ~~second square values~~ stored in a second window buffer, and determining a point with the minimum ~~mean square value~~ first ratio of square values to be the starting point of a null symbol, wherein the first square values samples stored in the first window buffer are squares of first samples and the second square values stored in the second window buffer are squares of second samples and the first samples follow the second samples follow the samples stored in the second window buffer, and outputting a search period control signal for changing from the first search period to a second search period;

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(a2) in response to the search period control signal, calculating ~~the mean~~ second ratios of square values for the second search period by dividing the sum of the square of each sample third square values stored in the first window buffer by the sum of the square of each sample fourth square values stored in the second window buffer, and determining a point with the maximum mean square value second ratio of square values to be the end point of the null symbol, wherein the samples third square values stored in the first window buffer are squares of third samples and the fourth square values stored in the second window buffer are squares of fourth samples and the third samples follow the fourth samples ~~follow the samples stored in the second window buffer; and~~

(a3) calculating the null symbol length using the starting and end points of the null symbol detected in steps (a1) and (a2).

10. (currently amended) The method of claim 9, wherein the first search period is equal to the frame length for MODE 1 of the digital audio broadcasting scheme, and the second search period is longer than the null symbol length for MODE 1 as defined in the present specification.

11. (currently amended): The method of claim 9, wherein step (b) comprises the sub-steps of:

(b1) comparing the null symbol length calculated in step (a) with a first boundary value for mode determination;

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(b2) determining the current mode to be a first mode and terminating the mode determination if ~~the condition of step (b1) is satisfied~~ it is determined in step (b1) that the null symbol length calculated in step (a) is less than a first boundary value;

(b3) comparing the calculated null symbol length with a second boundary value for mode determination if ~~the condition of step (b1) is not satisfied~~ it is determined in step (b1) that the null symbol length calculated in step (a) is not less than the first boundary value;

(b4) determining the current mode to be a second mode and terminating the mode determination if ~~the condition of step (b3) is satisfied~~ it is determined in step (b3) that the null symbol length calculated in step (a) is less than the second boundary value;

(b5) comparing the calculated null symbol length with a third boundary value for mode determination if ~~the condition of step (b3) is not satisfied~~ it is determined in step (b3) that the null symbol length calculated in step (a) is not less than the second boundary value;

(b6) determining the current mode to be a third mode and terminating the mode determination if ~~the condition of step (b5) is satisfied~~ if it is determined in step (b5) that the null symbol length calculated in step (a) is less than the third boundary value; and

(b7) determining the current mode to be a fourth mode and terminating the mode determination if ~~the condition of step (b5) is not satisfied~~ if it is determined in step (b5) that the null symbol length calculated in step (a) is not less than the third boundary value.

12. (original): The method of claim 11, wherein the first, second and third boundary values are set according to the null symbol length for each mode.

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13. (currently amended): The method of claim 12, wherein the first, second and third boundary values are respectively determined for each mode set so that the boundary values are in the order of increasing null symbol length for each mode.

14. (currently amended): The method of claim 12, wherein the first boundary value is set to a value between the null symbol lengths for MODE 3 and MODE 2 of the digital audio broadcasting scheme as defined in the present specification, the second boundary value is set to a value between the null symbol lengths for MODE 2 and MODE 4 of the digital audio broadcasting scheme as defined in the present specification, and the third boundary value is set to a value between the null symbol lengths for MODE 4 and MODE 1 of the digital audio broadcasting scheme as defined in the present specification.

15. (currently amended): An apparatus for detecting a transmission mode in an OFDM receiver, comprising:

a null symbol length calculation unit for calculating ~~the~~ a null symbol length of each ~~sample frame~~ by detecting the starting and end points of the null symbol of each-sample frame by obtaining ratios of sums of squared symbol values; and

a mode determination unit for determining a transmission mode by comparing the null symbol length calculated by the null symbol length calculation unit with a predetermined range of the null symbol length for each mode.

16. (canceled).

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17. (currently amended): A method for detecting a transmission mode in an OFDM receiver, comprising the steps of:

(a) calculating ~~the~~ a null symbol length of each ~~sample~~ frame by detecting the starting and end points of the null symbol of each ~~sample~~ frame by obtaining ratios of sums of squared symbol values; and

(b) determining a transmission mode by comparing the null symbol length calculated in step (a) with a predetermined range of the null symbol length for each mode.

18. (canceled).